WORKSHOP PROBLEM 8b

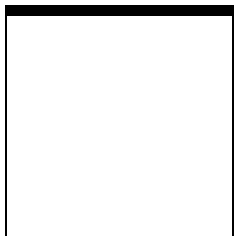
Comparison of Reduced Stiffness Matrix with Full Model

Objectives:

- Bring in the reduced stiffness and analyze the equivalent model. Compare the results with the full model.

Procedure:

1. Bring in the DMIG punch file generated in workshop #8a.
2. Attach the reduced stiffness matrix to the vertical members of the frame structure.
3. Compare the results with the full model.



Hints:

- Bring in the reduced stiffness matrix using the K2GG Case Control Command.

Model Input File for Modification:

wkshp8b.dat

```
 $
SOL    101  $
TIME   5
CEND
TITLE = bring in the cross bar using dmig
DISP = ALL
SPC = 1
$
$      (CASE CONTROL COMMAND TO BRING IN DMIGs)
$
SUBCASE 1
LABEL = STATIC LOAD CASE
LOAD = 1
$
BEGIN BULK
$
$      (INCLUDE DMIG ENTREES)
$
GRID    1       0       0.0     0.0     0.0
GRID    2       0       0.0     10.     0.0
GRID    3       0       0.0     20.     0.0
GRID    4       0       0.0     30.     0.0
$
GRID    7       0       30.     30.     0.0
GRID    8       0       30.     20.     0.0
GRID    9       0       30.     10.     0.0
GRID    10      0       30.     0.0     0.0
$
GRID    100     0       50.     50.     0.0          123456
$
CBAR    1       1       1       2       100
CBAR    2       1       2       3       100
CBAR    3       1       3       4       100
CBAR    7       1       7       8       100
CBAR    8       1       8       9       100
CBAR    9       1       9       10      100
$
FORCE   1       4       0       1000.   1.
$
$ CONSTRAINTS BULK DATA ENTRIES
$
SPC1    1       123456  1       10
$
$ PROPERTY AND MATERIAL BULK DATA ENTRIES
$
PBAR    1       13.46     1.            1.           2.
MAT1    1       1.+7            .3
$
ENDDATA
```

Solution Input File:

soln8b.dat

```
$
SOL    101  $
TIME   5
CEND
TITLE = bring in the cross bar using dmig
DISP = ALL
SPC = 1
$
k2gg = kttgext
$
SUBCASE 1
LABEL = STATIC LOAD CASE
LOAD = 1
$
BEGIN BULK
$
include 'wkshp8a.pch.1'
$
GRID    1       0       0.0     0.0     0.0
GRID    2       0       0.0     10.     0.0
GRID    3       0       0.0     20.     0.0
GRID    4       0       0.0     30.     0.0
$
GRID    7       0       30.     30.     0.0
GRID    8       0       30.     20.     0.0
GRID    9       0       30.     10.     0.0
GRID    10      0       30.     0.0     0.0
$
GRID    100     0       50.     50.     0.0          123456
$
CBAR    1       1       1       2       100
CBAR    2       1       2       3       100
CBAR    3       1       3       4       100
CBAR    7       1       7       8       100
CBAR    8       1       8       9       100
CBAR    9       1       9       10      100
$
FORCE   1       4       0       1000.   1.
$
$ CONSTRAINTS BULK DATA ENTRIES
$
SPC1    1       123456  1       10
$
$ PROPERTY AND MATERIAL BULK DATA ENTRIES
$
PBAR    1       13.46     1.            1.           2.
MAT1    1       1.+7            .3
$
ENDDATA
```

Input File for Full Model:

wkshp8-full.dat

```
$
SOL    101  $
TIME   5
CEND
TITLE = FULL MODEL
DISP = ALL
SPC = 1
$
SUBCASE 1
LABEL = STATIC LOAD CASE
LOAD = 1
$
BEGIN BULK
$
GRID    1       0       0.0     0.0     0.0
GRID    2       0       0.0     10.     0.0
GRID    3       0       0.0     20.     0.0
GRID    4       0       0.0     30.     0.0
$
GRID    5       0       10.     30.     0.0
GRID    6       0       20.     30.     0.0
GRID    7       0       30.     30.     0.0
$
GRID    8       0       30.     20.     0.0
GRID    9       0       30.     10.     0.0
GRID    10      0       30.     0.0     0.0
$
GRID    100     0       50.     50.     0.0          123456
$
CBAR    1       1       1       2       100
CBAR    2       1       2       3       100
CBAR    3       1       3       4       100
CBAR    4       1       4       5       100
CBAR    5       1       5       6       100
CBAR    6       1       6       7       100
CBAR    7       1       7       8       100
CBAR    8       1       8       9       100
CBAR    9       1       9       10      100
$
FORCE   1       4       0       1000.   1.
$
$ CONSTRAINTS BULK DATA ENTRIES
$
SPC1    1       123456  1       10
$
$ PROPERTY AND MATERIAL BULK DATA ENTRIES
$
PBAR    1       13.46     1.            1.           2.
MAT1    1       1.+7            .3
$
ENDDATA
```

Results Comparison Between Reduced and Full Model:

Compare the results obtained in the **.f06** file with the results below:

---------- RESULTS FROM REDUCED MODEL ----------

D I S P L A C E M E N T V E C T O R

POINT ID	TYPE	T1	T2	T3	R1	R2	R3
1	G	.0	.0	.0	.0	.0	.0
2	G	3.459926E-02	1.237283E-04	.0	.0	.0	-6.085717E-03
3	G	1.050316E-01	2.474567E-04	.0	.0	.0	-7.166622E-03
4	G	1.612490E-01	3.711850E-04	.0	.0	.0	-3.242715E-03
7	G	1.608159E-01	-3.711850E-04	.0	.0	.0	-3.228278E-03
8	G	1.047750E-01	-2.474567E-04	.0	.0	.0	-7.147373E-03
9	G	3.451906E-02	-1.237283E-04	.0	.0	.0	-6.0712/0E-03
10	G	.0	.0	.0	.0	.0	.0
100	G	.0	.0	.0	.0	.0	.0

---------- RESULTS FROM FULL MODEL ----------

D I S P L A C E M E N T V E C T O R

POINT ID	TYPE	T1	T2	T3	R1	R2	R3
1	G	.0	.0	.0	.0	.0	.0
2	G	3.459926E-02	1.237283E-04	.0	.0	.0	-6.085717E-03
3	G	1.050316E-01	2.474567E-04	.0	.0	.0	-7.166622E-03
4	G	1.612490E-01	3.711850E-04	.0	.0	.0	-3.242715E-03
5	G	1.609603E-01	-7.059396E-03	.0	.0	.0	1.043098E-03
6	G	1.609603E-01	6.963150E-03	.0	.0	.0	1.047911E-03
7	G	1.608159E-01	-3.711850E-04	.0	.0	.0	-3.228278E-03
8	G	1.047750E-01	-2.474567E-04	.0	.0	.0	-7.147373E-03
9	G	3.451906E-02	-1.237283E-04	.0	.0	.0	-6.071280E-03
10	G	.0	.0	.0	.0	.0	.0
100	G	.0	.0	.0	.0	.0	.0